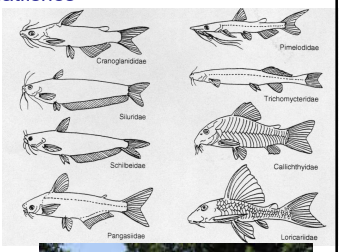
Otophysi, Order Siluriformes, catfishes

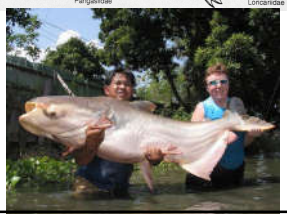
- >3400 species, >450 genera, 35 families
- >1800 in N. & S. America
- “any damned fool knows a catfish” - A. Carr

- Lack scales
- locking dorsal & pectoral spines
- 1-4 pairs of barbels

- Teeth on roof of mouth

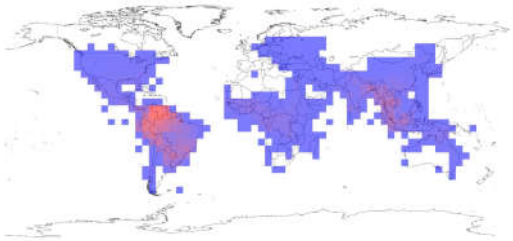
- High trophic diversity



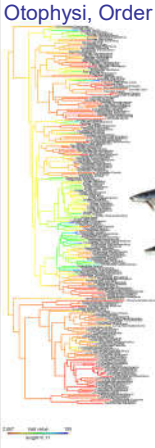


Otophysi, Order Siluriformes, catfishes

- Heat map of global diversity (by genera):



Otophysi, Order Siluriformes, catfishes



- Catfish phylogeny (~50% of genera) with colors representing body size.
- Large variation in body size with strong phylogenetic signal (red=small, blue=large).


Ariidae


Pimelodidae

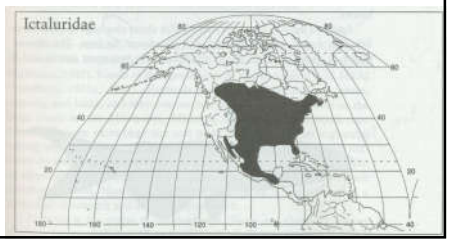

Trichomycteridae


Loricaridae

Otophysi, Order Siluriformes, Family Ictaluridae, North American catfish

- 46 species, 7 genera
- thick, scaless skin
- 4 pairs of barbels
- adipose fin

- Four blind species (cave adaptations)



Mississippi Catfishes

Ameiurus nebulosus

- 17 species, 4 genera
- Most support commercial or recreational fishery
- *Noturus* - Largest genera (number of species)

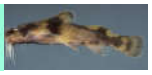
Ictalurus nebulosus

Noturus miurus

Noturus exilis

Pylodictus olivaris

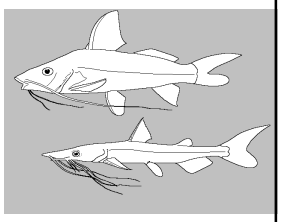
Noturus gyrinus



Noturus munitus

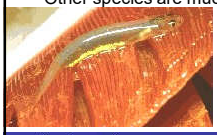
Otophysi, Order Siluriformes, Family Pimelotidae

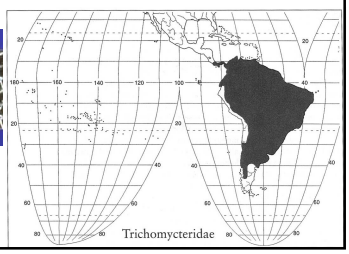
- 31 genera, ~85 species
- 3 pairs barbels,
- Well developed adipose fin



Otophysi, Order Siluriformes, Family Trichomycteridae

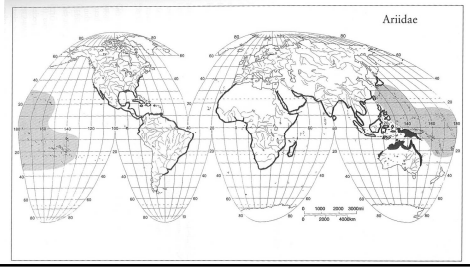
- Pencil or parasitic catfish
- Loss of adipose fin
- Other species are mucus or scale feeding specialists





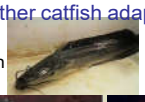
Otophysi, Order Siluriformes, Family Ariidae

- 21 species
- 3 pairs barbels, may be nasal
- Marine or brackish
- Male mouthbrooders



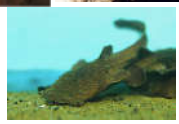
Otophysi, Order Siluriformes – other catfish adaptations

- Air breathing, terrestrial locomotion
- Claridae



- Suckermouth
- Loricaridae

- Cutaneous brooders and jet propulsion
- Aspredinidae



- Climbing ability (climbing catfish)
- Astroblepidae
- Angler catfish

Otophysi, Order Siluriformes – other catfish adaptations

- Electric field generation and detection

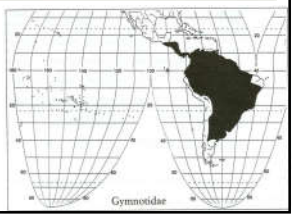
- Upside down orientation

- Mouthbrooders

Otophysi, Order Gymnotiformes, American Knifefishes

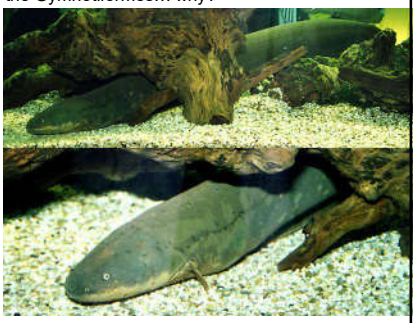
- 134 species, 34 genera, 5 families
- No pelvic fins or girdle
- Anal fin > 100 rays
- South America
- Electric organs (neurogenic or myogenic)

- Small gills
- Oral respiratory organ in some



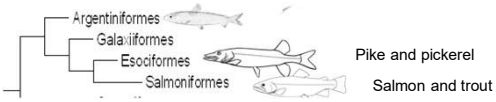
Otophysi, Order Gymnotiformes, Family Gymnotidae, naked back knifefish

- electric “eel”
- Eel like but is clearly in the Gymnotiformes… why?



Superorder Protacanthopterygii

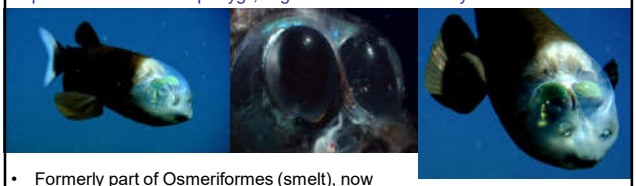
- Taxonomically problematic group
- 4 orders: ~12 families, 94 genera, 366 species
  - Disjunct global distribution
  - Highly modified primitive teleosts



Pike and pickerel

Salmon and trout

Superorder Protacanthopterygii, Argentiniformes – barreleyes and marine smelt



- Formerly part of Osmeriformes (smelt), now thought to be basal to all Protacanthopterygii
- No spines, adipose fin, light organs
- Barrel eyes (Opisthoproctidae) have transparent dome:

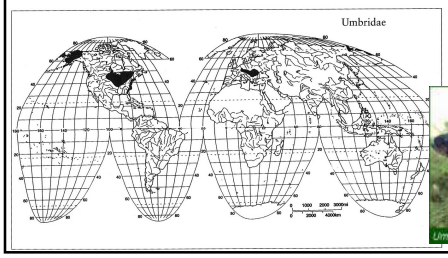
Superorder Protacanthopterygii, Order Esociformes

- 10 species, 4 genera, 2 families
- Maxilla toothless
- Posterior dorsal and anal fins
- No adipose fin
- No pyloric caeca
- Two families
  - Umbridae – mud minnows
  - Esocidae – pikes

Superorder Protacanthopterygii, Order Esociformes, Family Umbridae

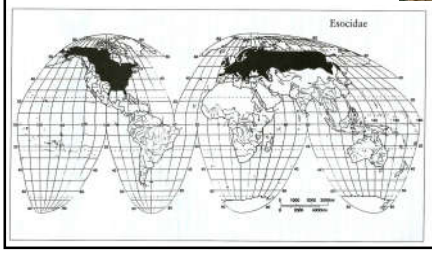
- 5 species, 3 genera

- Reduced snout, smaller body
- limited air breathers



Superorder Protacanthopterygii, Order Esociformes, Family Esocidae

- 5 species, 1 genus, 4 species in North America
- Snout, forked caudal fin
- Freshwater
- Piscivorous



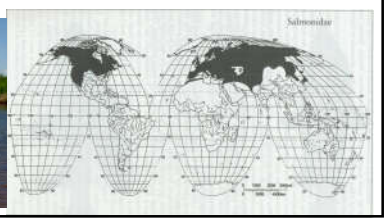
Osmeriformes, Galaxiiformes – galaxids

- Coldwater southern distribution (S. Africa, S. America, Australia, New Zealand)
- Commercial fisheries

- Salamanderfish – no eye muscles, moveable head, "reinvented" the swim bladder

Superorder Protacanthopterygii, Order Salmoniformes, salmon, trout, charr and grayling

- 66 (?) species, 11 genera, 1 family (Salmonidae)
- Northern hemisphere
- high commercial recreational value



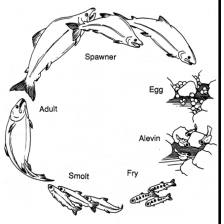
Superorder Protacanthopterygii, Order Salmoniformes, salmon, trout, charr and grayling

- Adipose fin
- Small scales

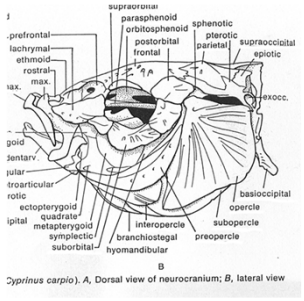
- Parr marks on young
- Some Iteroparous, some Semelparous

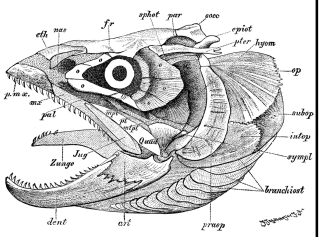
Superorder Protacanthopterygii, Order Salmoniformes, salmon, trout, charr and grayling

- Some freshwater, many anadromous
  - Parr develop in freshwater streams, imprint on stream “smell”



- Life history makes them amenable to farming
- Dams a conservation concern, western states implement ladders
- Conservation concern with farm reared populations



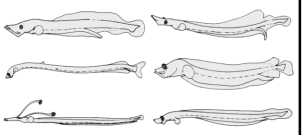


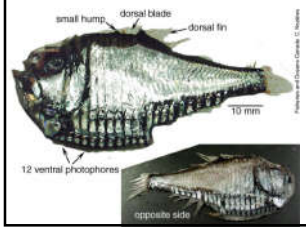
Order Osmeriformes, smelts

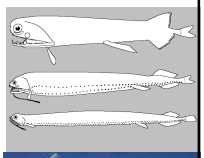
- 3 families, 22 genera, 88 species
- Marine, freshwater and diadramous
- Single soft rayed dorsal fin
- Adipose fin usually present
- Maxilla usually part of gape

Order Stomiformes, lightfish, dragonfish, marine hatchetfish

- 391 species, 53 genera, 5 families
- Photophores
- Many taxa with loss of fins
- Many with chin barbels
- Cycloid scales often lost
- Premax and maxilla in gape

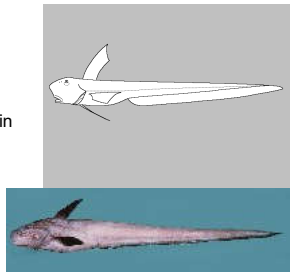


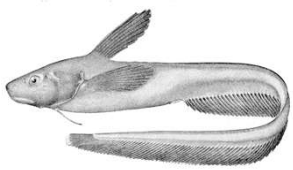


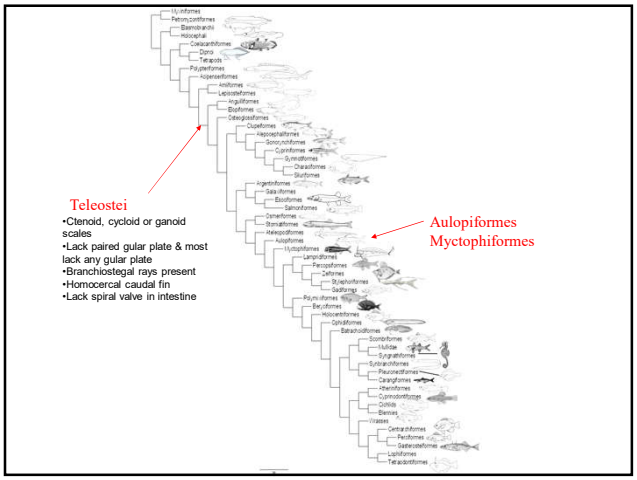


Order Ateleopodiformes, jellynose fish

- 12 species, 4 genera, 1 family (Ateleopdidae)
- Pelvic fins reduced to single ray
- Caudal fin reduced, united with anal fin
- Bulbous snout







Order Aulopiformes, lizardfish

- 236 species, 44 genera, 15 families
- Benthic and bathypelagic
- All deep sea except Synodontidae
- Many synchronous hermaphrodites
- Spineless fins
- Adipose fin